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Understanding accretion onto neutron stars with near-infrared and X-ray observations

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X-ray binaries, which are neutron stars or black holes accreting gas from a companion star, emit radiation across the electromagnetic spectrum. Whereas it is well established where their X-ray and radio emission originates, it is much less clear where their infrared emission comes from: is it coming from the cooler outer part of the disk, the companion star, a jet, or a hot flow? During my thesis, l analyzed near-infrared images obtained for many different neutron star low-mass X-ray binaries with the 6.5-m Magellan telescope located in Las Campanas Observatory in Chile to measure the near-infrared flux. By comparing the obtained near-infrared luminosities with earlier obtained X-ray luminosities, I investigate what the dominant near-infrared emission processes are and whether this changes depending on how fast the neutron star is accreting. Since different emission processes predict different correlations between the X-ray and near-infrared bands, such studies can contribute to our understanding of the dominating emission processes. I compare my results for this large sample of neutron stars with the X-ray and near-infrared properties of accreting black holes to see what the differences and similarities are. This will be an important contribution to our general understanding of accretion onto neutron stars and black holes and the outflows they produce.

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